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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/823,754	04/03/2001	Young-ho Ahn	Q61477	9101

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EXAMINER


PATHAK, SUDHANSHU C

ART UNIT	PAPER NUMBER
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2634

DATE MAILED: 02/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/823,754	Applicant(s) AHN, YOUNG-HO 	
	Examiner Sudhanshu C. Pathak	Art Unit 2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on October 12<sup>th</sup>, 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 5-12 is/are rejected.
- 7) ☒ Claim(s) 3 and 4 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on April 3<sup>d</sup>, 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. Claims 1-to-12 are pending in the application.

#### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 5 & 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant Admitted Prior Art (AAPA) in view of Teng et al. (5,285,280) in further view of Dieterich et al. (5,065,242).

Regarding to Claims 1, 5 & 7, the AAPA discloses a transmitter and receiver for transmitting and receiving a data frame of a VSB transmission system (Fig. 1A-B & Specification, Page 2, lines 2). The AAPA also discloses the received data frame to include a training sequence contained in the field sync signal transmitted from the transmitter (Fig. 1A-B & Specification, Page 2, lines 5-13). The AAPA further discloses an adaptive equalizer used in the receiver for compensation of a channel distortion, such as tilt and ghost wherein the equalizer comprises a filter comprising a number of taps determined by the maximum range of ghosts to be canceled (Specification, Page 2, lines 14-22). However, the AAPA does not disclose determining the correlation values (auto and cross) so as to adaptively adjusting the equalizer tap length.

Teng discloses a system and process for canceling ghosts in a sampled, received video signal (Abstract, lines 1-2 & Fig. 1a-d). Teng discloses extracting a received ghost canceling reference signal from the received video signal transmitted through the multipath channel (Abstract, lines 2-5). The received ghost canceling reference (GCR) signal and an ideal ghost canceling (GCR) reference signal are inputted into a signal processor and compared so as to determine the equalizer coefficient (Column 1, lines 50-68 & Column 2, lines 1-68 & Fig. 2a-c). Teng also discloses that the processor computes the auto-correlation of the ideal GCR and the cross-correlation of the ideal and received GCR so as to compute the equalizer transversal filter coefficients (Abstract, lines 5-14 & Column 4, lines 25-65). Teng further discloses determining ghost tap coefficient signal, that is implemented by the transversal filter (equalizer), by comparing the above-mentioned computed auto-correlation and cross-correlation signals (Column 4, lines 25-68 & Column 6, lines 51-68 & Column 7, lines 1-57 & Eq.'s 7-8 & Fig. 11 & Claim 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Teng discloses a detecting a multipath information by using the auto correlation, of the ideal GCR, and the cross correlation, of the received GCR and the ideal GCR, computed in the receiver and this can be implemented in the VSB system as described in the AAPA so as to minimize the taps of the equalizer and maintain the accuracy of the receiver. However, the AAPA in view of Teng teaches canceling the ghosts by using the tap coefficients computed by dividing the auto-correlation and

the cross-correlation instead of determining the coefficients by determining the difference of the auto-correlation and the cross-correlation values.

Dieterich discloses a method and apparatus for removing multipath distortion from the video signals (Abstract, lines 1-5 & Column 1, lines 5-20). Dieterich also discloses methods employed for deghosting employ techniques at the receiver for comparing the received test signal and the ideal version of the test signal in order to configure a filter to remove multipath components from the received signal (Column 1, lines 14-18). Dieterich further discloses computing the difference between the received signal and the ideal version of the received signal stored in the receiver so as to compute the coefficients of the deghosting filter (Column 5, lines 35-68 & Column 6, lines 1-15 & Column 9, lines 55-68 & Fig. 1, elements 30-44 & Fig. 4, element 112). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Dieterich teaches a method and apparatus for removing the multipath distortion by comparing (computing the difference) the received test signal and the ideal version of the test signal in order to configure a filter to remove multipath components from the received signal and this can be implemented in the receiver as described in the AAPA in view of Teng so as to provide accurate and reliable results, thus satisfying the limitations of the claims. Furthermore, there is no criticality in computing the multipath information by computing the difference between the auto-correlation (of stored training sequence) and the cross-correlation (of stored training sequence and received training sequence), Teng uses the division operator to compare the auto-correlation (of

stored training sequence) and the cross-correlation (of received and stored training sequence), this is only a matter of design choice. The comparing can be performed using a multiple of arithmetic (logical) operators.

4. Claims 2, 6 & 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant Admitted Prior Art (AAPA) in view of Teng et al. (5,285,280) in further view of Dieterich et al. (5,065,242) in further view of Whitaker (ATSC DTV Receiver Systems; Chapter 17.2; [www.tvhandbook.com/support/pdf\\_files/Chapter17\\_2.pdf](http://www.tvhandbook.com/support/pdf_files/Chapter17_2.pdf)) in further view of "thefreedictionary.com".

Regarding to Claims 2, 6 & 8-12, the Applicant Admitted Prior Art (AAPA) in view of Teng in further view of Dieterich discloses an apparatus and method for adjusting a filter tap length for an adaptive equalizer comprising a multipath detector for detecting multipath from the difference between the computed the auto-correlation, between the reference training sequence, and cross-correlation, between the reference and the received training sequence, as described above. The AAPA further discloses a data field sync segment comprising 4 sync symbols and 700 symbols of training sequence that are used for determining multipath and used for ghost cancellation in the adaptive equalizer (Fig. 1B & Specification, Page 2, lines 1-13). However, the AAPA in view of Teng in further view of Dieterich does not disclose a first and second multiplexer for enabling the input data and reference signal when the sync signal is "high".

Whitaker discloses a data field sync detection circuit so as to determine if the field sync signals have been detected on a given data segment, the signal becomes available for use by subsequent circuits (Page 17-70, Fig. 17.2.6 & Page 17-70, Sec. 17.2.2e "Data Field Synchronization"). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention Whitaker teaches implementing a data field synchronization circuit to detect the field sync signal enabling the signal to be further processed, and this can be implemented in the VSB system receiver as described in AAPA in view of Teng in further view of Dieterich so as to detect the sync symbols to begin the equalization process. Whitaker further discloses using 704-symbol training sequence for the equalization process (Page 17-80, Section 17.2.21 "Equalizer Performance using Training Signals" & Page 17-81, Fig. 17.2.15). However, AAPA in view of Teng in further view of Whitaker does not disclose a multiplexer used to implement the selection switching to enable the input data and the reference data.

The "thefreedictionary.com" discloses multiplexer circuitry so as to select a certain signal depending on the "selection" signal (Page 2, Section Digital Circuit Design). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that "thefreedictionary.com" teaches implementing a switching circuit using multiplexers so as to pass a specified signal depending on a control signal, and multiple of these circuits can be implemented for both the reference signal and input signal as described in AAPA in view of Teng in further view of Dieterich in further view of Whitaker, wherein the sync detection circuit

output can be used as the control signal, thus satisfying the limitations of the claim. Furthermore, "thefreedictionary.com" serves as the implementation of the multiplexer circuit and the field sync signal comprises a control signal and the data field sync detection circuit as described in Whitaker can be used to detect the sync signal so as to begin processing of equalization as described in AAPA in view of Teng.

***Allowable Subject Matter***

5. Claims 3 & 4 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

6. Applicant's arguments with respect to claims 1-2 & 5-7 have been considered but are moot in view of the new ground(s) of rejection.


***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure, it is recommended to the applicant to amend all the claims so as to be patentable over the cited prior art of record. A detailed list of pertinent references is included with this Office Action (See Attached "Notice of References Cited" (PTO-892)).
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (571)-272-3038. The examiner can normally be reached on M-F: 9am-6pm.



- If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571)-272-3056
- The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.
- Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sudhanshu C. Pathak



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